The Rise of Cancer Among the Elderly in Hawaii

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The purpose of this study was to determine if time trends in cancer incidence among the elderly in Hawaii were similar to the trends observed in the mainland United States and to determine if the trends were comparable among the various ethnic groups living in Hawaii. Average annual incidence rates per 100,000 persons, age 65 or older, were determined by sex and ethnicity for the time periods 1973 to 1977 and 1983 to 1986 through the Hawaii Tumor Registry, a population-based central cancer registry. The incidence of all cancers combined increased 27% among men and 26% among women between the 2 time periods. Similar to the rest of the United States, melanoma and cancers of the brain, lung, colon, breast and prostate have risen substantially among elderly Hawaii residents. Comparisons across ethnic groups revealed that melanoma increased mainly among Caucasians, lung cancer increased primarily among Hawaiians and Caucasians, and colon cancer increased in all ethnic groups.

Introduction

The elderly population in the United States is growing rapidly. Over the next 60 years it is estimated that the number of persons 65 years of age or older will increase 4 1/2 times faster than that of persons under age 65.[1] One of the main health concerns of the elderly is the occurrence of cancer. More than 50% of the patients diagnosed with cancer in the United States are age 65 or older, even though this age group constitutes only 12% of the population.[2]

Recent studies have indicated that cancer rates are rising among the elderly in the United States.[1-5] Cancers that are contributing to this increase include melanoma, multiple myeloma, cancers of the brain, lung, colon, and prostate. We had the opportunity in Hawaii to study the time trends in cancer incidence rates among the elderly through the existence of a long-standing cancer registry. This analysis was conducted to see if the cancer trends among the Hawaii elderly were similar to the trends in the rest of the United States and to determine if the trends were comparable among the major ethnic groups in Hawaii.

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Methods

The Hawaii Tumor Registry (HTR) is a population-based cancer registry for the entire state; it was the principal source of data for this investigation. This registry has been in operation since 1960 and has been a participant in the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) program since its inception in 1973.[6] Patients were identified by the medical records and admissions departments of hospitals, pathology laboratories and clinics throughout Hawaii. Only patients with a known date of birth who were residents of Hawaii were included in this analysis.

The quality and completeness of the data were ensured through the re-abstraction of a sample of the medical records from each hospital, and by extensive edit and logic checks built into the computer software to evaluate the consistency and validity of the responses. There also have been annual audits of the Hawaii Tumor Registry by the National Cancer Institute's SEER staff to inspect abstracting, coding, and case-finding procedures.

Ethnic classification was self-reported at the time of hospitalization. Individuals were assigned to one of the following ethnic categories: Caucasian, Chinese, Filipino, Hawaiian, Japanese or other. Patients with mixed ethnicity who claimed partial Hawaiian ancestry were classified as Hawaiian. Mixtures of other ethnic groups and persons classified as "other" were not included in the study; they constituted only 4.6% of the cases identified by the HTR.

The primary site of cancer was assigned by the HTR according to the International Classification of Diseases for Oncology (ICDO) adopted in 1976 by the World Health Organization.[7]

To determine the incidence rates for newly diagnosed cases during the 1973 to 1977 and 1983 to 1986 time periods, the 1980 census population based on age, sex and ethnicity was used. Age-adjusted incidence rates were computed by the direct method using the 1970 United States Standard Population according to 5-year age groups.[8]

Results

Table 1 presents the 10 most rapidly increasing cancers among men aged 65 and older from 1973 to 1977 and 1983 to 1986 for all 5 ethnic groups combined. The largest percentage of increase in incidence was for melanoma with a gain of 209% between the 2 time periods. The next highest increase was for brain cancer, followed by thyroid cancer, colon cancer, multiple myeloma and lung cancer. Interestingly, the 3 most common cancers among elderly men (prostate, lung and colon) were included

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Table 1

Ten cancer sites with the greatest percent increase in incidence rates from 1973-77 to 1983-86 among men age 65 and older.

	Average annual incidence rate per 100,000				
Site	1973-77	No of cases	1983-86	No of cases	Percent increase
Melanoma	17.2	(26)	53.1	(97)	209
Brain and other nervous system	5.3	(9)	10.7	(20)	101
Thyroid	6.0	(9)	9.3	(18)	55
Colon	171.6	(245)	265.4	(476)	55
Multiple myeloma	15.9	(23)	22.0	(40)	39
Lung	212.7	(311)	273.1	(545)	38
Prostate	362.7	(494)	491.1	(860)	35
Urinary bladder	90.3	(125)	117.2	(205)	30
Rectum	102.4	(148)	126.1	(231)	23
Kidney and renal pelvis	25.1	(37)	30.2	(56)	21
TOTAL CANCER	1520.0	(2155)	1934.5	(3473)	27

among the 10 cancers listed in Table 1. For all cancer sites combined, the average annual incidence rate increased by 27% between the 2 time periods.

As shown in Table 2, melanoma also had the largest percentage of increase in incidence among women aged 65 and older, followed by cancer of the liver, ovary and brain. As with men, the 3 most commonly diagnosed cancers in elderly women (breast, colon and lung) also were included among the 10 cancers listed in Table 2. There was a 26% increase in total cancer incidence between the 2 time periods among the women.

Table 2

Ten cancer sites with the greatest percent increase in incidence rates from 1973-77 to 1983-86 among women age 65 and older.

	Average annual incidence rate per 100,000				
Site	1973-77	No of cases	1983-86	No of cases	Percent increase
Melanoma	5.5	(8)	23.8	(47)	331
Liver	7.5	(11)	15.2	(28)	103
Ovary	19.4	(27)	35.9	(70)	96
Brain and other nervous system	5.4	(8)	10.3	(20)	89
Larynx	3.4	(5)	5.7	(11)	68
Colon	119.3	(174)	187.7	(360)	57
Breast	213.7	(313)	328.5	(633)	54
Lung	86.0	(126)	120.1	(231)	40
Kidney and renal pelvis	12.9	(19)	17.7	(34)	37
Multiple myeloma	13.6	(20)	17.3	(33)	27
TOTAL CANCER	989.6	(1442)	1250.3	(2406)	26

MELANOMA

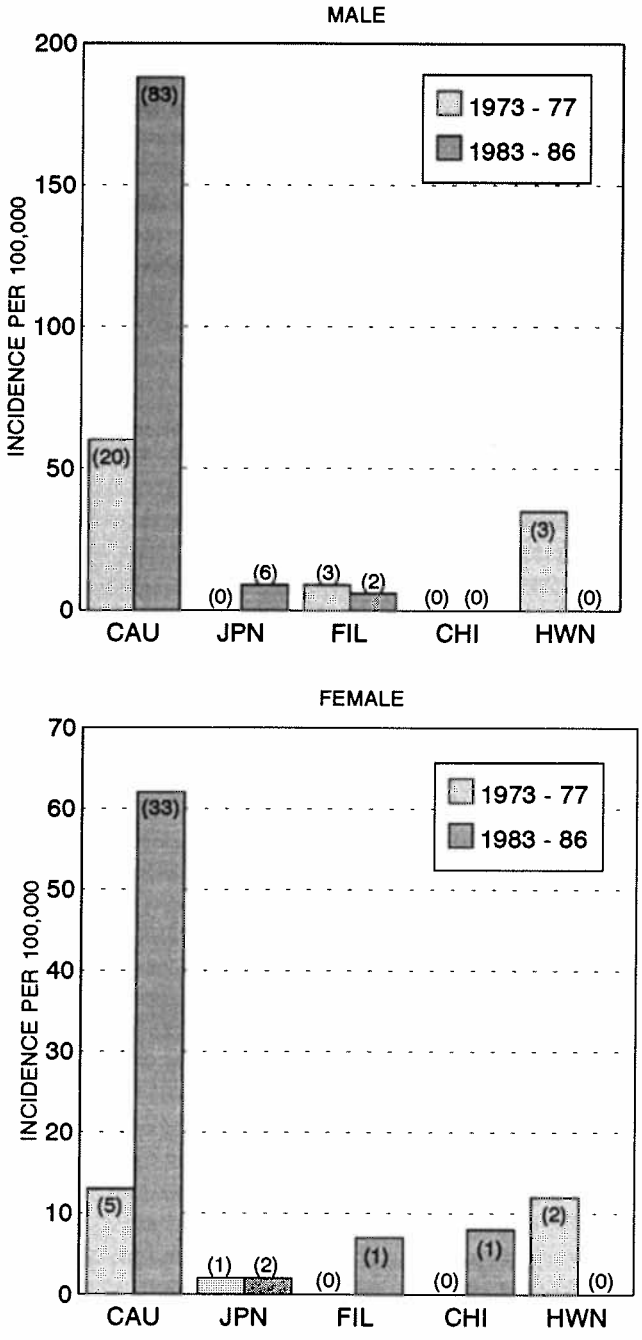

Fig 1. - Average annual incidence rates per 100,000 of melanoma by sex and ethnicity for the time period 1973-77 and 1983-86. Number of cases is in parenthesis.

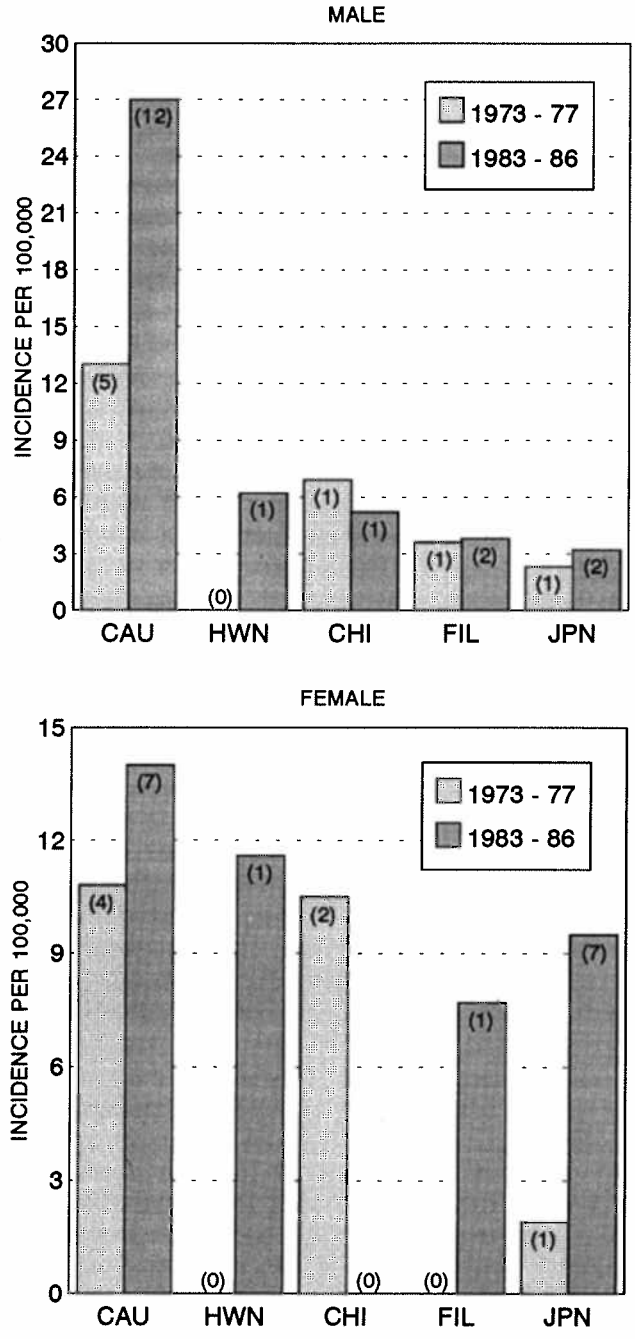

Fig 2. - Average annual incidence rates per 100,000 of brain and central nervous system cancer by sex and ethnicity for the time period 1973-77 and 1983-86. Number of cases is in parenthesis.

Fig 1 presents the average annual incidence rates for melanoma by sex and ethnicity for the time periods 1973 to 1977 and 1983 to 1986. The rise in melanoma incidence occurred mainly among Caucasians who experienced more than a twofold rise in melanoma rates between the 2 time periods. There were too few cases of melanoma in the other ethnic groups (14 in men and 7 in women) to investigate changes in risk with time.

Brain and other nervous system cancers were higher among Caucasian men and women than among the other ethnic groups (Fig 2), but the relatively small number of cases made the ethnic-specific rates unstable.

Lung cancer incidence rates increased most rapidly among Hawaiian and Caucasian men and women, with smaller increases observed among the Japanese (Fig 3). Chinese men and Filipino women experienced a decline in incidence rates between the 2 time periods.

Colon cancer incidence increased substantially among elderly men and women in all ethnic groups, although the increase among Filipino men was a modest one (Fig 4). The rates of colon cancer were highest among Caucasians and lowest among Hawaiians and Filipinos. However, the percent increase from 1973 to 1977 and 1983 to 1986 was greatest among Hawaiian men (151%) and Hawaiian women (69%).

The prostate cancer rates rose for all ethnic groups. The percent increase was 44% for Japanese (from 285 to 409 cases per 100,000 per year), 36% for Filipino (from 331 to 449), 17% for Hawaiian (from 381 to 445), 15% for Caucasian (from 599 to 690) and 3% for Chinese men (from 396 to 407). Prostate cancer incidence among Caucasians was at least 50% greater than that among Filipinos who have the next highest incidence during the 1983 to 1986 time period.

Breast cancer among elderly women increased among all ethnic groups except Filipinos, whose rates have actually declined between the two time periods. The percent increase was 137% for Japanese (from 114 to 270 cases per 100,000 per year), 68% for Chinese (from 184 to 310), 34% for Hawaiian (from 341 to 456) and 5% for Caucasian women (from 449 to 472). The percent decrease was 28% for Filipino women (from 116 to 83 cases per 100,000 per year).

No discernible ethnic differences in incidence trends emerged for the other cancers such as multiple myeloma and cancers of the liver, larynx, thyroid, rectum, bladder, kidney and pelvis. There was an increase in incidence for cancer of the ovary in all ethnic groups from 1973 to 1977 and 1983 to 1986.

Discussion

There was a similar increase in the incidence of all cancers from 1973 to 1977 and 1983 to 1986 among elderly men (27% increase) and women (26% increase). The cancers with the highest percent increase among the men in Hawaii included melanoma, multiple myeloma and cancers of the brain, thyroid, colon, lung and prostate. With the exception of thyroid cancer, the risk for developing these cancers also has increased substantially in other parts of the United States.[3,4] Among elderly women, the incidence of melanoma and cancers of the liver, ovary, brain, larynx, colon and breast increased substantially in

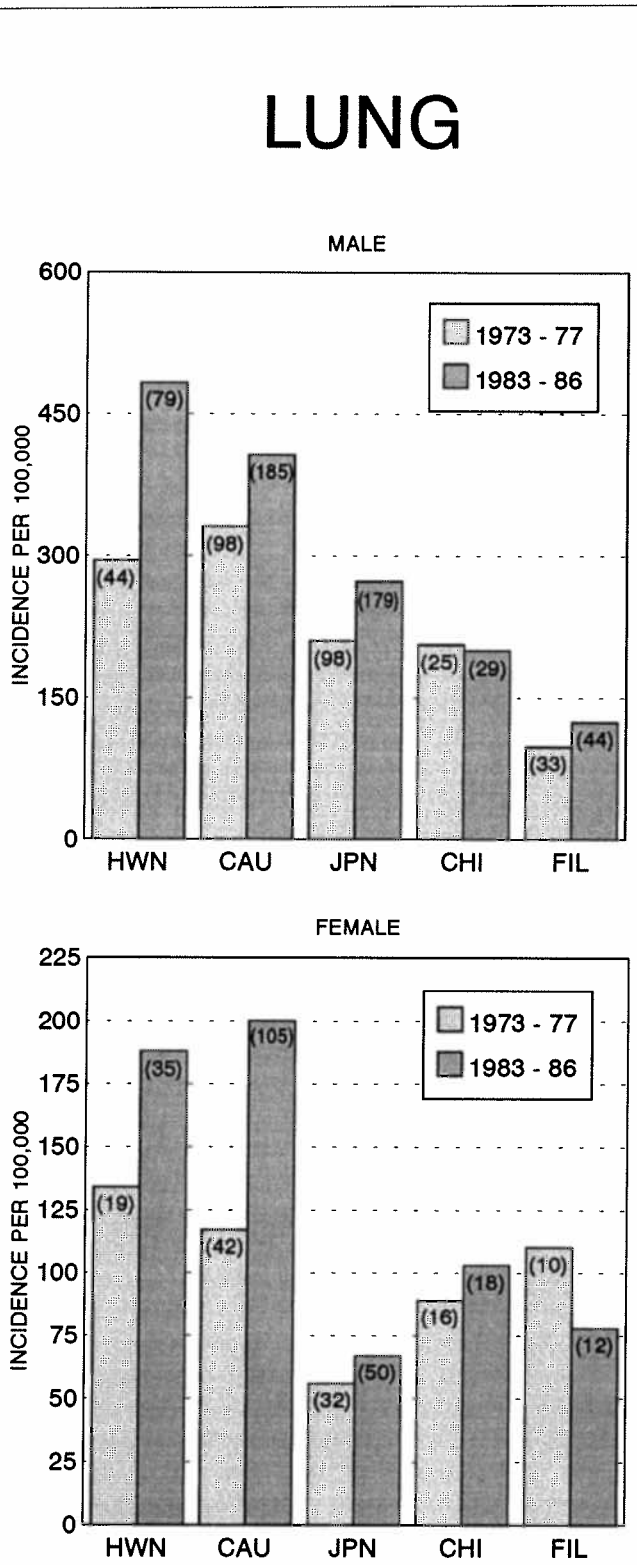

Fig 3. - Average annual incidence rates per 100,000 of lung cancer by sex and ethnicity for the time period 1973-77 and 1983-86. Number of cases is in parenthesis.

Hawaii during the 14 years of observation. This pattern was similar to that reported for other parts of the United States.[3,4]

Melanoma.—Caucasian men and women in Hawaii have experienced a rapid rise in the incidence of malignant melanoma. National data also have shown a dramatic increase in melanoma incidence among elderly whites.[4] Melanoma is uncommon among the other Hawaii ethnic groups and remained so during the period of this study. Tumor registry data from other geographic areas besides the United States also indicate that the incidence of melanoma is low among the Chinese, Japanese and Polynesians.[9] Past studies have convincingly shown that whites are susceptible to developing melanoma and that the presence of nevi, freckling tendency, tropical residence and history of severe sunburns contribute to the risk of being diagnosed with melanoma.[10,11]

Brain and Other Nervous System Cancers.—The incidence of brain and other nervous system cancers increased substantially among elderly men and women between 1973 to 1977 and 1983 to 1986. The rates for these cancers were highest among whites of both sexes. Nationally, there has been a significant increase in brain cancer rates among the elderly.[3] A number of exposure factors including trauma, radiation, viruses, chemicals, smoking, alcohol, lead exposure, maternal oral contraceptive use, and maternal smoking history have been studied in relation to the occurrence of brain tumors, but the data are not conclusive.[12]

Lung Cancer.—Lung cancer was the second most common cancer among elderly men and the third most common cancer among elderly women in Hawaii. Consequently, the percentage of increase, though less than that of melanoma and brain cancer, still resulted in a substantial absolute increase in the annual incidence rates for this cancer in both sexes (60 per 100,000 in men and 34 per 100,000 in women). The rates have increased significantly in Hawaiian and Caucasian men and women, with more modest changes in Filipino and Chinese residents. The percentage of cigarette smokers is higher among Hawaiians and Caucasians than among Filipinos and Chinese in Hawaii.[13] This difference in cigarette smoking prevalence appears to account for only some of the observed ethnic variation in lung cancer rates.[14]

Colon cancer.—Colon cancer ranked second in frequency among elderly women and third among elderly men in Hawaii. It is established that inflammatory bowel diseases, such as ulcerative colitis, Crohn's disease, and certain inherited diseases, such as familial polyposis of the large bowel, increase the risk for colon cancer, but these conditions account for only a small percentage of the total cases.[15]

Alcohol consumption, dietary fat intake, physical inactivity, and large body mass have been associated with colon cancer, but more work is needed to establish these relationships as causal.[15] The ethnic patterns of exposure for some of these factors are not consistent with the corresponding colon cancer rates in Hawaii. For example, Hawaiians consume more dietary fat[16] and alcohol[13] than the Chinese, but the Chinese have higher rates of colon cancer.

Prostate Cancer.—The prostate is the most common cancer

site among elderly men; it is suspected that male sex hormones, dietary fat, occupational exposures and familial factors have a role in the etiology of prostate cancer, but the findings are not conclusive.[17] We have found that dietary fat and carotene intake were positively associated with prostate cancer risk among very elderly men in Hawaii.[18]

Breast Cancer.—Breast cancer is by far the most common cancer among women in Hawaii. The causes of this cancer are still unknown, but increased risk has been associated with a family history of breast cancer, a history of fibrocystic breast disease, early age at menarche, late age at menopause, late age at first full-term pregnancy, obesity, and radiation exposure.[19] Other suspected risk factors include oral contraceptive use, estrogen replacement therapy, high dietary fat intake, and alcohol consumption.[19] In a case-control study in Hawaii, we found that a family history of breast cancer, a history of benign breast disease, early age at menarche, late age at menopause and late age at first childbirth increased the risk for breast cancer.[20]

Conclusion

In general, the cancers that have increased in incidence among the elderly in Hawaii are similar to the cancers that have risen in the rest of the U.S. This is particularly true for melanoma and cancers of the brain, lung, colon, prostate, and breast. A comparison of the increases in cancer incidence rates across ethnic groups revealed the following noteworthy patterns: 1) melanoma has increased primarily among Caucasians; 2) lung cancer has increased mainly among Hawaiians and Caucasians in both sexes; 3) colon cancer incidence has increased substantially in elderly men and women in Hawaii; 4) prostate cancer has increased in all ethnic groups, but minimally among Chinese men; and 5) breast cancer has increased in all ethnic groups except elderly Filipino women.

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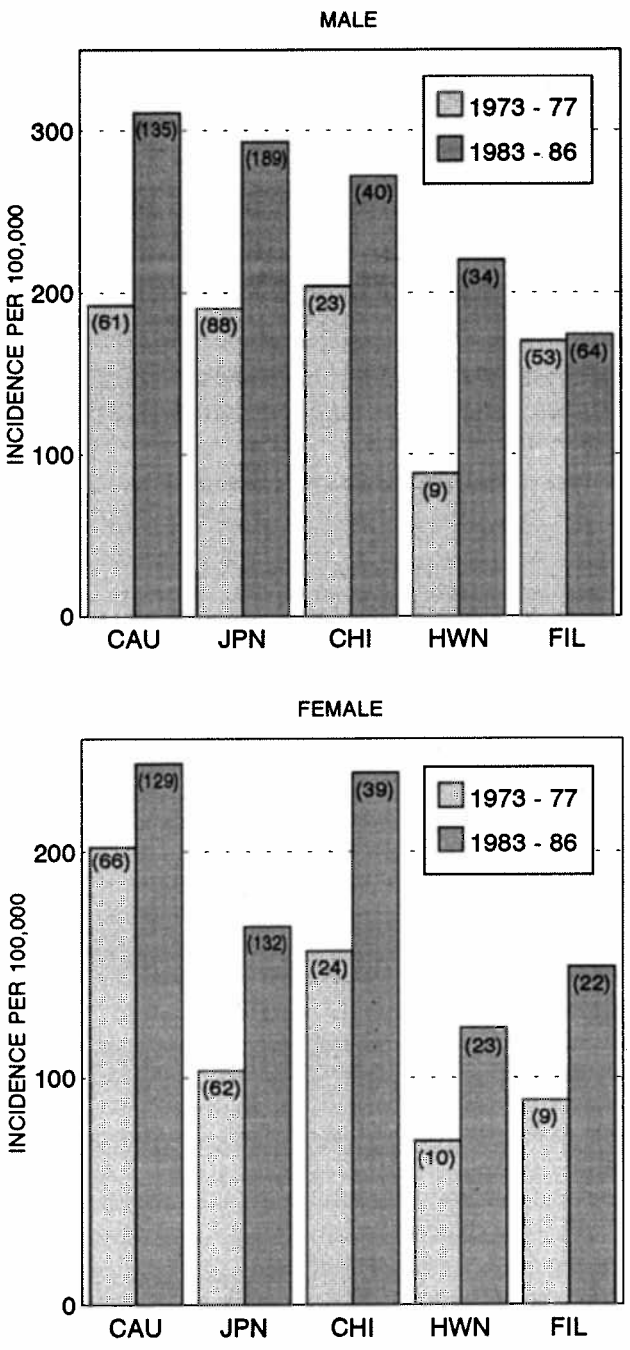

Fig 4. - Average annual incidence per 100,000 of colon cancer by sex and ethnicity for the time period 1973-77 and 1983-86. Number of cases is in parenthesis.

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